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Impact of a nursing education program about caring for patients in Japan with malignant pleural mesothelioma on nurses' knowledge, difficulties and attitude: A randomized control trial

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SUMMARY

Purpose: In Japan nursing care lags behind the growing population of patients with malignant pleural mesothelioma. This study evaluated an educational program for nurses about caring for patients with malignant pleural mesothelioma in Japan.
Method: In this randomized controlled study relative to care for malignant pleural mesothelioma, Knowledge, Difficulties and Attitude were measured at baseline, at post-test and at follow-up one month later. The two-day program with a half-day follow-up program included lectures, group work, role-playing and group discussion. 188 participants were randomly assigned to the intervention group (program, n = 96) and control group (n = 92; *self-study by a similar content handbook*). At baseline the groups showed no statistical differences in Knowledge (p = 0.921), Difficulty (p = 0.458) and Attitude (p = 0.922). Completing the study were 177 participants yielding 88 in the intervention group and 89 in the control group. Human rights and privacy of participants were protected.
Results: The Knowledge score was significantly higher in the intervention post-test (t = 14.03, p = 0.000) and follow-up test (t = 8.98, p = 0.000). Difficulty score was significantly lower in the intervention at post-test (t = −3.41, p = 0.001) and follow-up test (t = −3.70, p = 0.000). The Attitude score was significantly higher in the intervention post-test (t = 7.11, p = 0.000) and follow-up test (t = 4.54, p = 0.000). The two-way analysis of variance with repeated measures on time showed an interaction between time and group; the subsequent simple main effect test found significant differences (p = 0.000–0.001) between groups for after-program and at follow-up and a significant difference (p = 0.000) in time only within the intervention group.
Conclusion: The educational program was effective in improving the nurses' knowledge and attitude toward malignant pleural mesothelioma care and decreasing the difficulty in MPM care, therefore this program has potential for nurses' in-service education throughout Japan.

Introduction

Mesothelioma is a rare malignancy that can affect the pleura, peritoneum and pericardium (Gibbs and Craighead, 2008). It is casually linked to asbestos exposure (Wagner et al., 1960; Selikoff et al., 1965; Yang et al., 2008). The World Health Organization (WHO) reported that there were 92,253 deaths by mesothelioma between 1994 and 2008 and that the number is growing especially in those countries that continue to use asbestos (Delgermaa et al., 2011). In taking measures to prevent exposure to asbestos, Japan is about 20 years behind the United States of America and European countries in banning the use of asbestos. Malignant pleural mesothelioma (MPM), the most common type of mesothelioma in Japan, caused 1200 deaths in 2010 and the number of deaths is growing since the first case of MPM was reported in 1973 (Japan Ministry of Health, Labor and Welfare, 2012). Based on exposure and current prevalence rates, it is estimated that from 2000 to 2040 there would be about 100,000 deaths in Japan due to MPM (Murayama et al., 2006).

MPM has a poor prognosis (Aisner, 1995) and causes debilitating physical symptoms such as pain, dyspnea, fatigue, loss of appetite and sweating (Ahmedzai and Clayson, 2006). The management of symptoms in MPM is complicated because symptoms are multi-causal and often appear simultaneously (Ahmedzai and Clayson, 2006; Wickersham et al., 2005). Like other patients with cancer, patients with MPM experience emotional difficulties such as the shock of diagnosis (Clayson et al., 2005), anxiety and depression (Knudsen, 1989).

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In addition, patients with MPM experience anger toward their employers who did not alert them to the hazard of asbestos (Knudsen, 1989), ambivalence about working in an unhealthy environment versus supporting their family (Knudsen, 1989), and the stress of dealing with lawsuits (Hughes and Arber, 2008; Knudsen, 1989; Clayson, 2003). There is wide agreement (Clayson et al., 2005; Darlison, 2010; Department of Health, 2007; Hawley and Monk, 2004; Knudsen, 1989) that MPM patients and care-givers need to be supported physically, mentally, socially and spiritually. Nurses' role in MPM care is to maximize the quality of life (QOL) of MPM patients and caregivers by provision of information (Darlison, 2010), elicitation of care preference (Darlison, 2010), symptom management (Cordes and Brueggen, 2003) and management of the care pathway throughout the illness (British Thoracic Society Standards of Care Committee, 2007). However, MPM patients' needs are not being met because nurses have little understanding of MPM patients' perspective (Clayson et al., 2005) and little experience and expertise in MPM care (Moore and Darlison, 2011). Improvement of MPM care requires nurses gaining knowledge of and skill in caring for patients with MPM. Since nurses have less opportunity to learn about MPM in clinical situations because it is still rare, education is recommended. Educational resources about MPM are very limited. However, the Mesothelioma UK and the School of Cancer Nursing and Rehabilitation at the Royal Marsden NHS Foundation Trust offer e-learning educational programs about mesothelioma care and management for nurses (Moore et al., 2012).

MPM in Japan

The research showed that MPM patients have little information about their disease and treatment options therefore they suffered from the pain of untreated symptoms and their needs were ignored (Nagamatsu et al., 2012a). Nurses who cared for MPM patients also experienced difficulties such as groping for care, failure of introducing palliative care, limitation of support for patients' decision making, difficulty in dealing with families, unsuccessful communication, and emotional distress from being with MPM patients who were in pain (Nagamatsu et al., 2012b). The health centers in Japan assigned nurses and other staff for asbestos health consultation services, but 76.2% of consultants were not confident about their knowledge of asbestos-related diseases (Nagamatsu, 2011). Difficulties experienced by Japanese nurses were mainly due to a shortage of knowledge about MPM and lack of experience in care of MPM. The need to gain knowledge about MPM and develop care skills was urgent. However, there were neither educational resources nor programs about MPM for nurses in Japan. Unfortunately the e-learning educational program about mesothelioma care and management by Mesothelioma UK and the School of Cancer Nursing and Rehabilitation at the Royal Marsden NHS Foundation Trust (Moore et al., 2012) was not relevant for Japanese nurses for several reasons, primarily due to the language barrier and secondly due to an insufficiency of content about extra pleural pneumonectomy which is not a common treatment in the UK but it is in Japan. In response to the educational needs of nurses in MPM care in Japan our team, including an oncology nurse, home visiting nurse, respiratory physician and liaison nurse developed an educational program.

The program was developed using the instructional system design (ISD) method and was designed to resolve the difficulties experienced by nurses in providing MPM care. This approach was based on Nagamatsu et al. (2012a, 2012b) research findings. The aim of this study was to assess the impact of the Educational Program about Nursing Care of Patients with MPM on nurses' (a) knowledge about MPM and its care, (b) difficulties in care for patients with MPM and (c) attitude toward care for patients with MPM.

Methods

This was a Randomized Control Trial (RCT) with base-line, post-test and follow-up test. The study had two arms comparing a control and intervention group. The intervention group attended the educational program and the control group received a handbook with similar content. This trial was carefully designed to conform to the CONSORT statement (Schulz et al., 2010).

Samples and Recruitment

Nurses with approximately two years of clinical experience were recruited as participants. A total of 4224 advertisement letters were sent nationwide to the heads or nursing directors of health care facilities targeting hospitals with respiratory wards or palliative care wards, cancer hospitals, home visiting nurse stations and health care centers. Recruitment was also conducted through the Mesothelioma Nursing Japan website established by the researchers.

Randomization

An independent statistician with no connection to the program and its evaluation managed the randomization process. This research measured the effectiveness of the program in terms of differences in scores based on knowledge, difficulty and attitude taken before and after training. To ensure that the treatment arms were balanced with respect to predefined patient factors as well as for the number of patients in each group the minimization method was adopted (Fernandes, 2005). This would help to ensure there would be no significant differences between these three scores before the program began. Therefore, the baseline test was conducted with preliminary testing by mail prior to random allocation, ensuring that there was no imbalance between the intervention group and control group in terms of the number of participants achieving high and low scores.

Hypothesis

The “Educational Program about Nursing Care of Patients with MPM” will increase knowledge, decrease difficulty with care and improve nurses' attitude compared to self-study with a handbook.

Intervention

A two-day program (14.5-h) and a follow-up program (3-h) were developed for this study (Nagamatsu, 2013). The contents of the program are displayed in Table 1. The lectures were given by pulmonologists, a thoracic surgeon, oncology nurses, a home visiting nurse and a liaison nurse. The three main programs were held from October to December in 2011. Each group had a maximum of 30 participants. A facilitator was assigned for every five to six participants. One month after the main program, the three-hour follow-up programs were held. There were 10 follow-up programs held from November 2011 to January 2012.

Outcome Measures

Three primary outcomes were measured: (a) knowledge of and treatment of MPM, (b) difficulties in caring for patients with MPM and (c) attitude toward care for patients with MPM.

The first two tools are original 10-item self-report inventories that were developed for this study. To assure content relevance, five nurses with clinical expertise in MPM reviewed the content and based on their comments, the necessary modifications were made. A pilot study was done on 10 nurses to test clarity and applicability of the tool and to determine the amount of time-on-task. The necessary modifications were then made to adjust to the nurses' level of understanding. The third tool regarding attitude was modified from an existing valid tool to become relevant for this study.

Knowledge and Treatment of MPM Scale

The Knowledge and Treatment of MPM Scale (Knowledge Scale) consists of 10 statements to measure knowledge about MPM such as

Table 1
Educational program.

Main program (14.5 h)
Day 1
Lecture 'Epidemiology, cause and benefits for patients with mesothelioma'
Lecture 'Diagnosis, types, stages, natural history of mesothelioma'
Lecture 'Chemotherapy for mesothelioma'
Lecture 'Extra pleural pneumonectomy'
Lecture 'Symptoms of mesothelioma and palliative care'
Narrative by patient with mesothelioma
Lecture 'Needs of patients and care givers in mesothelioma'
Day 2
Lecture 'Home visiting care and care coordination in mesothelioma'
Group work 'Symptom management of mesothelioma'
Role play 'Drawing out patient and family needs'
Role play 'Support decision-making'
Lecture 'Stress management of nurses who take care of terminal patients'
Follow-up program (3 h)
Group discussion
Lecture 'Care of patients and care givers in U.K. and U.S.A.'

histopathology, local invasion, chemotherapy, extra pleural pneumonectomy or social benefits. Participants answered 1 (*yes*) if statement is correct and 0 (*no*) if incorrect. The number of right answers was counted as the overall Knowledge score, which ranged from 0 to 10 with a higher score reflecting a higher level of knowledge.

Item-to-total correlations of each item ranged from 0.302 to 0.527 and each item had a significant correlation with the total score. According to the factor analysis, one factor was extracted with loadings ranging from 0.36 to 0.56. Principal component analysis was conducted and the items of factor loadings of factor I ranged from 0.438 to 0.625. Cronbach's α coefficients were 0.452 (baseline), 0.623 (post-test), 0.663 (follow-up test) and 0.741 for all data.

Difficulties in Caring for Patients with MPM Scale

The Difficulties in caring for patients with MPM scale (Difficulty Scale) consists of 10 items describing difficulty in care of MPM such as: 'failure of introducing palliative care', 'limitation of support for patients' decision making', 'difficulty in dealing with families', 'lacking communication skill' and 'painful being with MPM patients'. Participants answered on a 5-point Likert scale (*very difficult* = 5, *difficult* = 4, *neutral* = 3, *not difficult* = 2, *not at all difficult* = 1). A total score was computed for overall difficulty, which ranged from 10 to 50 with a higher score reflecting a more difficult situation.

Item-to-total correlations of each item ranged from 0.58 to 0.75 and all items had significant correlations. Also a principal component analysis with a three-factor solution was requested based on the result of the scree test. Factor I named Care Coordination had an eigenvalue of 5.54, which explained 55.4% of the variance. It consisted of five items with loadings ranging from 0.50 to 0.70. Factor II called Terminal Care, had an eigenvalue of 0.84, which explained 8.4% of the variance. It consisted of two items with loadings of 0.75 and 0.91. Factor III named Symptom Management, had an eigenvalue of 0.73, which explained 7.3% of the variance. It consisted of three items with loadings ranging from 0.48 to 0.76. Cronbach's α coefficients were: 0.873 at baseline, 0.923 after-program post-test, 0.901 at the follow-up test and 0.907 overall.

Attitude Toward Care for Patients with MPM Scale

The Attitude toward care for patients with MPM scale (Attitude Scale) consists of the short version of Japanese version of the Frommelt Attitudes Toward Care of the Dying scale (FATCOD-B-J), which was validated by Nakai et al. (2006), plus the addition of four original items: 'suggest second opinion', 'provide information', 'suggest application of social benefit', and 'suggest palliative care' that were identified as important by nurses caring for patients with MPM (Nagamatsu et al., 2012b). Nurses were given statements that could be answered on a 5-point Likert scale: (*strongly disagree* = 1, *disagree* = 2, *neutral* = 3, *agree* = 4, *strongly agree* = 5). A total score was computed for overall attitude, which ranged from 10 to 50 with a higher score reflecting better attitude.

Item-to-total correlations of each item were from 0.31 to 0.60 and all items had a significant correlation. Principal component analysis with a three-factor solution was conducted based on the results of scree test. Factor I named Hesitating to Provide Information, had an eigenvalue of 2.56, which explained 32.6% of the variance. It consisted of three items with loadings ranging from 0.58 to 0.75. Factor II had an eigenvalue of 1.9, which explained 23.5% of the variance and was called Expecting Family to Participate in Care. It consisted of three items with loadings ranging from 0.57 to 0.82. Factor III, Keeping a Distance from Patient had an eigenvalue of 0.85, which explained 10.6% of the variance. It consisted of two items with loadings of 0.43 and 0.59. Cronbach's α coefficients were 0.600 at baseline, 0.712 after-program post-test, 0.689 at the follow-up test and 0.719 with all data.

Sample Size

So far, there has been no previous research where a RCT has been conducted examining the effects of a program for nurses in relation to MPM care. Accordingly, sample numbers were calculated by referring to preceding research where nurses underwent a two-day program in which Knowledge scores after implementation of the program increased by 7% in the control group and by 24% in the intervention group (Ota, 2009). Therefore we set the parameters as: $\alpha = 0.05$ and $\beta = 0.8$. Assuming a 17% (24% − 7%) difference in the ratio of both groups with an anticipated 20% drop-out rate, we decided to sample 84 participants per group, giving a total sample of 168 participants. In addition the sample size would be adequate for conducting a factor analysis.

Procedure

Participants answered three questionnaires after the consent form was completed: (1) baseline, (2) post-test (just after the main program) and (3) follow-up test (one month after the main program). A questionnaire about demographic information was collected at baseline and the intervention group answered a feedback form as well.

Ethical Considerations

Human rights and privacy of participants were protected. All participants participated in this study based on confidential and voluntary participation. Informed consents were obtained from all participants. Moreover, the Research Ethics Review Board, St. Luke's College of Nursing (approval no. 11-034) approved this study.

Statistical Analysis

The participants completed three questionnaires at baseline, and a few additional questions regarding demographic information. Data were analyzed using the Statistical Package for the Social Science (SPSS version 19). A difference was considered significant when the corresponding p value was less than 0.05. The distribution of all variables was checked for normality; non-parametric statistics were used when appropriate. Characteristics of the study participants were compared between groups using the chi-square test for categorical variables and the *t*-test for continuous variables. To compare knowledge, difficulties and attitude of nurses in the intervention and control groups, *t*-tests were conducted. Furthermore, a two-way factorial ANOVA was conducted with the two main factors of 'presence/absence of intervention' and 'test implementation period' in order to examine the main effects of these main factors in terms of knowledge, difficulties and attitude, as well as considering whether or not there was any interaction

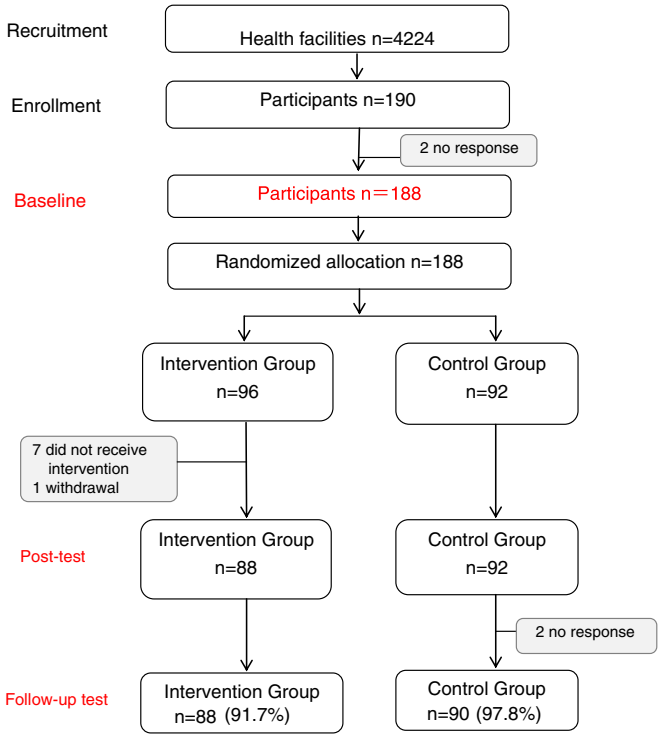

Fig. 1. Flow of the participants of the study.

between these two main factors. In cases where interaction was observed, inspections and multiple comparisons of the simple main effects were conducted in order to clarify which combination of 'presence/absence of intervention' and 'test implementation period' affected scores.

Results

Sample

Fig. 1 shows the flow of the participants throughout the study. Although 190 agreed to participate one was excluded who was not a nurse and one had no clinical experience. Of the remaining188 participants, 177 (94.2%) completed the study yielding 88 nurses in the intervention group and 89 in the control group. Ten participants were lost to follow-up.

Characteristics of Participants

The baseline characteristics of the participants are shown in Table 2. The majority of the participants were women and about 70% worked in a respiratory ward. The mean years of nursing experience was 10.2 years and 31.4% had no experience caring for mesothelioma patients and only 23.9% had ever studied about mesothelioma. Neither the characteristics of the participants nor the baseline scores in the intervention and control groups differed significantly.

Main Outcomes

Table 3 shows the mean scores of the Knowledge, Difficulty and Attitude questionnaires from the two groups at baseline, post-test and follow-up test. The hypothesis: the "Educational Program about Nursing Care of Patients with MPM" will increase knowledge, decrease difficulty with care and improve nurses' attitude compared to self-study with a handbook was supported.

Knowledge

The mean score among the intervention group was 4.81 at the baseline and significantly elevated to 8.07 ($p = 0.000$) at the post-test and 7.33 ($p = 0.000$) at the follow-up test, which was still significantly higher than the baseline. The control group mean score was 4.89 at the baseline, 4.97 ($p = 0.383$) at the post-test and 4.84 ($p = 0.842$) at the follow-up test, indicating no significant differences over time.

Table 2
Participants' baseline characteristics by group.

			N = 188			
			Intervention group		Control group	
			n = 96	%	n = 92	%
Gender	Female		91	(94.8)	88	(95.7)
	Male		5	(5.2)	4	(4.3)
Qualification	RN		96	(100.0)	92	(100.0)
(multiple answer)	Public health nurse		25	(26.0)	20	(21.7)
	Midwife		5	(5.2)	1	(1.1)
	Assistant nurse		1	(1.0)	1	(1.1)
	School Nurse		0	0.0	3	(3.3)
Current workplace	Respiratory ward		69	(71.9)	64	(69.6)
	Home nursing station		3	(3.1)	5	(5.4)
	OPD		4	(4.2)	3	(3.3)
	ICU		2	(2.1)	3	(3.3)
	PCU		1	(1.0)	2	(2.2)
	Others		17	(17.7)	15	(16.3)
Number of MPM patients cared for	None		28	(29.2)	31	(33.7)
	1–10		54	(56.3)	46	(50.0)
	11–100		13	(13.5)	12	(13.9)
	101+		1	(1.0)	3	(3.3)
Received educational program about MPM	Yes		24	(25.0)	21	(22.8)
	No		72	(75.0)	71	(77.2)
Years of experience as a nurse		Range	M	SD	M	SD
		1–38	10.6	8.2	10.1	7.4
Mean scores on measurements		Range	M	SD	M	SD
	Knowledge	0–9	4.8	2.0	4.8	1.9
	Difficulty	15–50	40.0	6.4	40.7	5.4
	Attitude	29–48	37.0	4.1	36.9	3.8

MPM = malignant pleural mesothelioma; OPD = outpatient department; ICU = intensive care unit; PCU = palliative care unit.

Table 3
Analysis of Knowledge, Difficulty and Attitude scores by group over time.

		Intervention group			Control group				Two-way analysis of variance		
		Baseline	Post-test	Follow-up test	Baseline	Post-test	Follow-up test		Interaction	Between groups	Time
Knowledge	Mean	4.81	8.07	7.33	4.83	4.91	4.82	F-value	51.92	94.86	60.16
	SD	2	1.20	2.04	1.91	1.75	1.68	p	0.000	0.000	0.000
Difficulty	Mean	40.01	34.80	33.74	40.65	38.75	38.19	F-value	7.01	11.52	32.86
	SD	6.38	7.89	9.56	5.39	5.39	6.15	p	0.001	0.001	0.000
Attitude	Mean	36.95	43.38	40.75	36.95	39.64	37.97	F-value	19.37	25.28	109.88
	SD	4.05	3.25	4.27	3.82	3.77	3.80	p	0.000	0.000	0.000

A two way ANOVA was performed on the Knowledge score. A significant ($p = 0.000$) interaction was found. Subsequent simple main effect test found a significant difference ($p = 0.000$) between the two groups at the post-test and the follow-up test and significant difference ($p = 0.000$) in time only within the intervention group (Fig. 2).

Difficulty

The mean score of Difficulty in the intervention group dropped significantly from 40.01 at the baseline to 34.80 ($p = 0.000$) at the post-test and 33.74 ($p = 0.000$) at the follow-up test. For the control group, the mean score decreased significantly from 40.65 at baseline to 38.75 ($p = 0.009$) and was 38.19 ($p = 0.000$) at follow-up test, which was still significantly lower than baseline.

A two way ANOVA was performed on the Difficulty score. A significant ($F = 7.01$, $p = 0.001$) interaction was found. Subsequent simple main effect test found a significant difference ($p = 0.001$) between the two groups at the post-test and the follow-up test and a significant difference ($p = 0.000$) in time only within the intervention group. Multiple comparisons showed that the Difficulty score dropped at the post-test and remained low at the follow-up test in both groups (Fig. 3).

Attitude

The intervention group score increased from 36.95 at the baseline to 43.38 ($p = 0.000$) at the post-test and dropped only slightly to 40.72 ($p = 0.000$) at the follow-up test. In the control group, the score was 36.89 at the baseline and was elevated to 39.64 at the post-test, which was significantly higher than the baseline ($p = 0.000$) and slightly decreased to 37.97 but was still significantly higher than the baseline ($p = 0.003$).

A two way ANOVA was performed on the Attitude score. A significant ($F = 9.73$, $p = 0.000$) interaction was found. Subsequent simple main effect test found a significant difference ($p = 0.000$) between the two groups at the post-test and the follow-up test. Also a significant difference ($p = 0.000$) only in time within the intervention group was found. Multiple comparisons showed that the Attitude scores in both groups were highest at post-test and dropped at the follow-up test however they were still higher than at the baseline (Fig. 4).

Discussion

This study was conducted to assess nurses' knowledge of, difficulties in and attitudes toward the care of people with MPM before, after and one month after the educational program. The findings of this study indicated that the "Educational Program about Nursing Care of Patients with MPM" was effective in increasing the nurses' knowledge, decreasing difficulty and improving attitude. The post-test Knowledge and Attitude scores increased significantly and dropped only slightly after one month in the intervention group, which was a similar result to previous pre-test and post-test educational studies (Ferrell et al., 1993; Francke et al., 1997; Linder et al., 1999; Razavi et al., 1993). The Difficulty scores also dropped on the post-test and dropped even further one month later in the intervention group. This was because nurses applied what they had learned from the program during that one month and shared experiences with other nurses at follow-up programs so that nurses could support each other.

Educational resources focusing on MPM are limited throughout the world. The Royal Marsden NHS Foundation Trust in the United Kingdom has provided an interactive online educational module on mesothelioma care and management for health workers (Moore et al., 2012). Unlike the UK, which had cases of MPM since the 1930s, the first case of MPM in Japan was reported in 1973 and has increased rapidly in the last 20 years. Nurses throughout Japan who had limited MPM knowledge and experience were having difficulties caring for patients with MPM (Nagamatsu et al., 2012b). Because it was urgent to quickly improve the knowledge and attitude of nurses, we introduced face-to-face learning with multifaceted methods patterned after similar studies reporting effectiveness (Shaw et al., 2010; Abdalrahim et al., 2011). This program was designed so that participants learned directly from pulmonologists, thoracic surgeons, oncology nurses, district nurses and liaison nurse who were specialized in MPM care and allowing them to ask questions, learn skills via role play and get advice from discussions.

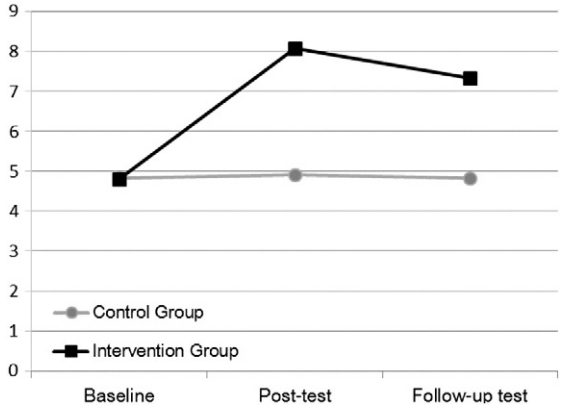

Fig. 2. Knowledge at baseline, post-test and follow-up test.

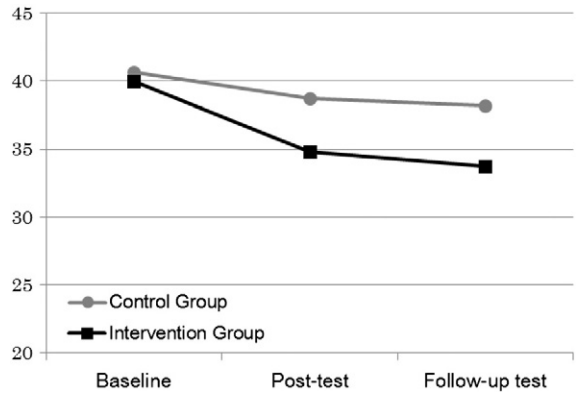

Fig. 3. Difficulty at baseline, post-test and follow-up test.

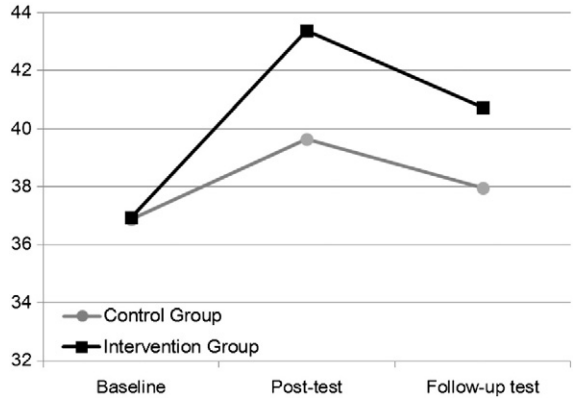

Fig. 4. Attitude at baseline, post-test and follow-up test.

While Japan had much to learn from the UK about caring for patients with MPM not all the knowledge and experience were directly transferable. There were gaps in nurses' needs between the two countries because in the UK, unlike Japan, palliative care is well established and treatments are considered not only for more than mere survival but also to keep the patients' quality of life as high as possible (Department of Health, 2007; Girling et al., 2002). In Japan the main focus and choice is radical treatment such as extra pleural pneumonectomy and chemotherapy. Clayson et al. (2005) reported that curative medical intervention such as pleural aspiration, radical surgery and chemotherapy often caused distress in patients with MPM. Nurses are expected to contribute to symptom management in MPM (Cordes and Brueggen, 2003). Japanese nurses need a high level of expertise to manage the symptoms of MPM patients who underwent extra plural pneumonectomy or chemotherapy. To meet Japanese nurses' needs, we introduced them to original learning contents such as the care of people who underwent extra pleural pneumonectomy, the role-play of patients with MPM who insisted on ineffective chemotherapy and group discussions. The fact that everyone in the intervention group participated in the follow-up program was an indicator that the program was addressing the nurses' needs.

Implications

This study has relevancy for the in-service education programs in healthcare institutions. To improve nurses' knowledge and attitude and ease difficulties, it is essential to use multiple learning methods such as role-plays and group discussions. Nurses gained an understanding of people with MPM and care-givers by putting themselves into the patient's position. Care skills were promoted by acting as a nurse, using what they learned from the program. Although in this study the participants were experienced nurses the content and learning approach would also be appropriate for nursing education in nursing schools.

Because of the shortage of time, we included minimal content regarding palliative care. However, following the conclusion of this study, an advanced program about palliative care in MPM with lectures and group works was held. Participants in this program attended and reported even less sense of difficulty in providing nursing care for MPM patients.

Limitations

Several limitations of this study need to be taken into account. First, this study evaluated the effectiveness of the program until only one month. It is recommended to carry out examinations with a longer follow-up period. Second, this study was designed to evaluate the effectiveness of the program by measuring the change in knowledge, difficulty and attitude of nurses. The psychometric properties of the measurement tools could be strengthened. To clarify how the program improved the nurses' care of people with MPM, care outcome measures such as evaluation by the receiver of care and co-workers are recommended.

Conclusion

This study examined the effectiveness of an educational program about the Nursing Care of Patients with MPM using a RCT design. The findings indicated that the educational program for nurses might be effective in improving the nurses' knowledge and attitude toward MPM care as well as decreasing their difficulty in caring for patients with MPM.

Conflicts of Interest

The authors declare no conflict of interest.

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